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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,684	01/15/2004	Andreas H. von Flotow	367618014US1	4952
25096	7590	11/01/2005	EXAMINER	
PERKINS COIE LLP			SHEPARD, JUSTIN E	
PATENT-SEA			ART UNIT	
P.O. BOX 1247			PAPER NUMBER	
SEATTLE, WA 98111-1247			2617	

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/758,684	VON FLOTOW ET AL.	
	Examiner	Art Unit	
	Justin E. Shepard	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed October 13th, 2005 have been fully considered but they are not persuasive. The applicant is arguing that the system disclosed in Brunner will result in "large variations in successive calculations for the line of sight of the camera, which causes the target to jump around the image as the adjustments are made." The examiner could not find any support for this argument in the disclosure.

The closest section found was "dynamic adjustments allow for smooth and continuous adjustments to be made based on velocity." This section does not make any reference to the static adjustments being "choppy" or inaccurate.

2. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the applicant is arguing that there is no motivation for using the Koyanagi system in the system disclosed by Brunner. The motivation provided by the examiner stated an added benefit for combining the systems would be allowing the system to track an object purely in a visual manner. Even though use of the system would not be as accurate (due to the lack of static adjustments from the Brunner system), it would still have an added benefit

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of being able to track an object without the planning required to know the object's position prior to the flight. Also this combination would use both systems together; as the system disclosed by Koyanagi is a tracking system to be used in a stationary manner, and it would rely on the aircraft aspect of the Brunner to system to be used to track an object from an aircraft.

3. The applicant is also arguing "if Koyanagi's system was somehow combined with Brunner's system, there would be no need for Brunner's system to recalculate its pointing parameters." The applicant discloses the following in the specification: "By combining the static and dynamic adjustments, the compensation system can more accurately keep the line of sight of the camera on the target." Therefore by his own disclosure the applicant has made a case of how the two systems would be combined and used together.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 3, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi.

Referring to claim 1, Brunner discloses a method for controlling the line of sight of a camera to remain fixed on a target (column 2, lines 20-23), the camera being on a

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vehicle whose current position is moving at a velocity relative to a current position of the target (column 2, lines 23-24), the method comprising: setting an initial line of sight for the camera that is aimed at the current position of the target (column 1, lines 31-38); periodically setting the line of sight of the camera based on an adjustment angle that is calculated to compensate for a difference between a needed line of sight derived from the current position of the vehicle and the current position of the target and the current line of sight of the camera (column 3, lines 51-61; column 2, lines 20-23); and maintaining the line of sight of the camera as the attitude of the vehicle changes relative to the current position of the target.

Brunner does not disclose a method for periodically setting an angular velocity for moving the line of sight of the camera that is calculated to compensate for the current velocity of the vehicle relative to the target; and maintaining the line of sight of the camera in accordance with the set angular velocity and set line of sight.

Koyanagi discloses a method for periodically setting an angular velocity for moving the line of sight of the camera that is calculated to compensate for the current velocity of the vehicle relative to the target (column 19, lines 28-43); and maintaining the line of sight of the camera in accordance with the set angular velocity and set line of sight.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that the system where the object moves relative to the camera is equivalent to a system where the camera moves relative to the target.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that the panning speed from Koyanagi is the same as angular velocity. Brunner teaches that panning can be represented by an angle (column 6, example 1) and therefore the speed of the panning could be defined as an angular velocity.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the image based angular velocity tracking of Koyanagi to the airborne position tracking system disclosed in Brunner. The motivation for doing this would have been to add the ability to track objects with unknown positions as taught by Koyanagi, when the current position of the aircraft is not known.

6. Referring to claim 2, Brunner discloses a method where the target is at a fixed position (column 2, line 21).

Referring to claim 3, Brunner discloses a method where the vehicle is airborne (column 2, lines 22-23).

Referring to claim 6, Brunner discloses a system where the initial line of sight of the camera is set based on the current position of the target and the current position and attitude of the vehicle (column 1, lines 31-38).

Referring to claim 7, Brunner discloses a method of claim 1, wherein the attitude includes pitch, roll, and heading (column 6, lines 14-17 and 21-25; Note: attitude is defined as orientation of an aircraft's axes relative to a reference line or plane, which is interpreted to be equivalent to the aircraft's azimuth as disclosed in Brunner).

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 1 above, and further in view of EO Target Geolocation Determination.

Brunner and Koyanagi disclose a method where the initial line of sight of the camera is set based on an operator centering the line of sight of the camera on the target (column 4, lines 55-58).

Brunner and Koyanagi do not disclose a method that calculates the current position of the target based on the current position of the vehicle and altitude of the target.

EO Target Geolocation Determination discloses a method to calculate the current position of the target based on the current position of the vehicle and altitude of the target (page 6, figure 3; Note: The only inputs to the system are location of the sensor, the line of sight attitude, and the image; and the output is the location of the target).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the method disclosed in EO Target Geolocation Determination to the method disclosed by Brunner and Koyanagi to add the ability to record the locations of objects observed by the imaging system to be used at a later time; for example it could be used to look for downed planes and have the ability to record their position for later use by a rescue team.

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8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Koyanagi as applied to claim 1 above, and further in view of Williams.

Brunner and Koyanagi do not disclose a method where a gyroscope is used to maintain the line of sight of the camera.

Williams discloses a method where a gyroscope is used to maintain the line of sight of the camera (column 1, lines 62-64).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the gyroscope from Williams to the tracking method disclosed by Brunner and Koyanagi. The motivation for doing so would have been to stabilize the camera from vibrations (column 2, lines 28-35).

9. Claims 9, 10, 11, 12, and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi.

Referring to claim 9, Brunner discloses a method for controlling the orientation of a device to remain fixed on a target (column 2, lines 20-23), the device being on a vehicle that is moving at a velocity relative to a current position of the target (column 2, lines 23-24), the method comprising: setting an initial orientation for the device that is aimed at the current position of the target (column 1, lines 31-38); periodically setting the orientation of the device that is calculated based on the current position of the device and the current position of the target (column 3, lines 51-61; column 2, lines 20-23); and maintaining the orientation of the device in accordance with the set orientation as the attitude of the vehicle changes relative to the current position of the target.

Brunner does not disclose a method for periodically setting a velocity for moving the orientation of the device that is calculated to compensate for the current velocity of the vehicle relative to the target; and maintaining the orientation of the device in accordance with the set velocity and as the attitude of the vehicle changes relative to the current position of the target.

Koyanagi discloses a method for periodically setting a velocity for moving the orientation of the device that is calculated to compensate for the current velocity of the vehicle relative to the target (column 19, lines 28-43); and maintaining the orientation of the device in accordance with the set velocity and as the attitude of the vehicle changes relative to the current position of the target.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that the system where the object moves relative to the device is equivalent to a system where the device moves relative to the target.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the image based tracking of Koyanagi to the airborne position tracking system disclosed in Brunner. The motivation for doing this would have been to add the ability to track objects with unknown positions as taught by Koyanagi, when the current position of the aircraft is not known.

10. Referring to claim 10, Brunner discloses a method where the target is at a fixed position (column 2, line 21).

Referring to claim 11, Brunner discloses a method where the device is a camera (column 2, line 20).

Referring to claim 12, Brunner discloses a method where the vehicle is airborne (column 2, lines 22).

Referring to claim 16, Brunner discloses a system where the initial orientation of the device is set based on the current position of the target and the current position and attitude of the vehicle (column 1, lines 31-38).

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Koyanagi as applied to claim 9 above, and further in view of Avila.

Brunner and Koyanagi do not disclose a method where the vehicle is land based.

Avila discloses a method where the vehicle is land based (column 2, lines 6-7; column 3, lines 28-32).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to replace the vehicle disclosed by Brunner and Koyanagi with the land based vehicle from Avila. The motivation for doing so would have been to track objects from a remote location unknown to the object that you are tracking, which would most likely be inaccessible by aircraft.

12. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 9 above, and further in view of EO Target Geolocation Determination.

Brunner and Koyanagi disclose a method where the initial line of sight of the camera is set based on an operator centering the orientation of the device on the target (column 4, lines 55-58).

Brunner and Koyanagi do not disclose a method to calculate the current position of the target based on the current position of the vehicle and difference in altitude of the target between the current position of the vehicle and the current position of the target.

EO Target Geolocation Determination discloses a method to calculate the current position of the target based on the current position of the vehicle and difference in altitude of the target between the current position of the vehicle and the current position of the target (page 6, figure 3; Note: The only inputs to the system are location of the sensor, the line of sight attitude, and the image; and the output is the location of the target).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the method disclosed in EO Target Geolocation Determination to the method disclosed by Brunner and Koyanagi to add the ability to record the locations of objects observed by the imaging system to be used at a later time; for example it could be used to look for downed planes and have the ability to record their position for later use by a rescue team.

13. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Koyanagi as applied to claim 9 above, and further in view of Williams.

Brunner and Koyanagi do not disclose a method where a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers.

Williams discloses a method where a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers (column 1, lines 62-64).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the gyroscope from Williams to the tracking method disclosed by Brunner and Koyanagi. The motivation for doing so would have been to stabilize the camera from vibrations (column 2, lines 28-35).

14. Claims 18, 19, 20, 21, and 25 rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi.

Referring to claim 18, Brunner discloses a system for controlling the orientation of a device to remain fixed on a target (column 2, lines 20-23), the device being on a vehicle that is moving relative to a target (column 2, lines 23-24), comprising: a component that sets an initial orientation for the device so that the device is aimed at the target (column 1, lines 31-38); a component that periodically establishes a new orientation for the device that is calculated based on a current position of the device and a current position of the target (column 3, lines 51-61; column 2, lines 20-23); and a component that maintains the orientation of the device in accordance with the established orientation as the vehicle maneuvers.

Brunner does not disclose a system that includes a component that periodically establishes an adjustment rate for moving the orientation of the device during the period

that is calculated to compensate for the velocity of the vehicle relative to the target; and a component that maintains the established adjustment rate in accordance with the established orientation as the vehicle maneuvers.

Koyanagi discloses a system that includes a component that periodically establishes an adjustment rate for moving the orientation of the device during the period that is calculated to compensate for the velocity of the vehicle relative to the target (column 19, lines 28-43); and a component that maintains the established adjustment rate in accordance with the established orientation as the vehicle maneuvers.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that the system where the object moves relative to the device is equivalent to a system where the device moves relative to the target.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the image based tracking of Koyanagi to the airborne position tracking system disclosed in Brunner. The motivation for doing this would have been to add the ability to track objects with unknown positions as taught by Koyanagi, when the current position of the aircraft is not known.

15. Referring to claim 19, Brunner discloses a method where the target is moving (column 2, line 26).

Referring to claim 20, Brunner discloses a method where the device is a camera (column 2, line 20).

Referring to claim 21, Brunner discloses a method where the vehicle is airborne (column 2, lines 22-23).

Referring to claim 25, Brunner discloses a system where the initial orientation of the device is set based on the current position of the target and the current position and attitude of the vehicle (column 1, lines 31-38).

16. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 18 above, and further in view of Antikidis.

Brunner and Koyanagi do not disclose a system where the vehicle is space based.

Antikidis discloses a system that adjusts for movement while taking still pictures where the vehicle is space based (column 2, lines 10-12; column 2, lines 35-38).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to replace the vehicle disclosed in Brunner and Koyanagi with the space vehicle from Antikidis. The motivation for doing so would have been to enable the system to track objects in close proximity of a spacecraft.

17. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 18 above, and further in view of EO Target Geolocation Determination.

Brunner and Koyanagi disclose a system where the initial orientation of the device is set based on an operator centering the orientation of the device on the target (column 4, lines 55-58).

Brunner and Koyanagi do not disclose a system for calculating the initial position of the target based on the initial position of the vehicle and an initial difference in altitude between the vehicle and the target.

EO Target Geolocation Determination discloses a system for calculating the initial position of the target based on the initial position of the vehicle and an initial difference in altitude between the vehicle and the target (page 6, figure 3; Note: The only inputs to the system are location of the sensor, the line of sight attitude, and the image; and the output is the location of the target).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the method disclosed in EO Target Geolocation Determination to the method disclosed by Brunner and Koyanagi to add the ability to record the locations of objects observed by the imaging system to be used at a later time; for example it could be used to look for downed planes and have the ability to record their position for later use by a rescue team.

18. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 18 above, and further in view of Williams.

Brunner and Williams do not disclose a system where a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers.

Williams discloses a method where a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers (column 1, lines 62-64).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the gyroscope from Williams to the tracking method disclosed by Brunner and Koyanagi. The motivation for doing so would have been to stabilize the camera from vibrations (column 2, lines 28-35).

19. Claim 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi as applied to claim 18 above, and further in view of Williams.

Brunner and Williams do not disclose a system where the adjustment rate is angular velocity of a gimbal on which the device is mounted.

Williams discloses a system where the adjustment rate is angular velocity of a gimbal on which the device is mounted (column 1, lines 56-62; figure 2; Note: part 30 is referred to as the angle of error between the LOS and the platform axis; the error would be in the same direction as the movement and therefore the gimbal movement can be measured in the units of angular velocity).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to replace the device mount disclosed in Brunner and Koyanagi with the gimbal disclosed in Williams. The motivation for doing so would have been to decrease the size of the device mount, the small size being shown by the gimbal being located inside of a missile, and therefore decrease the effect of the wind on the vehicle.

20. Claims 28, 29, 30, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Koyanagi.

Brunner discloses a method for keeping a device locked on a target (column 2, lines 20-23), the device being on a vehicle and being initially oriented towards the target (column 1, lines 31-38), the method comprising: statically adjusting the orientation of the device that is calculated based on a current position of the device and a current position of the target (column 3, lines 51-61; column 2, lines 20-23); and maintaining the orientation of the device in accordance with the static adjustments as the vehicle maneuvers; and where the calculation for the static adjustment is performed at a time interval (figure 14); and where the orientation is statically adjusted once a time interval (figure 14; Note: the system disclosed is constantly updating and therefore the time interval would be however fast it can get through the tracking process before starting it again. Also it would only go through the process shown in figure 14 once per time interval, being the time it takes to get through the process).

Brunner does not disclose a method for keeping a device locked on a target, the device being on a vehicle and being initially oriented towards the target, the method comprising: dynamically adjusting the orientation of the device based on calculations to compensate for a velocity of the vehicle relative to the target; and maintaining the orientation of the device in accordance with the dynamic adjustments as the vehicle maneuvers; and where the calculation for the dynamic adjustment is performed at a time interval; and where the dynamic adjustment is a adjustment rate that is applied continuously during the time interval.

Koyanagi discloses a method for keeping a device locked on a target, the device being on a vehicle and being initially oriented towards the target, the method comprising: dynamically adjusting the orientation of the device based on calculations to compensate for a velocity of the vehicle relative to the target (column 19, lines 28-43); and maintaining the orientation of the device in accordance with the dynamic adjustments as the vehicle maneuvers; and where the calculation for the dynamic adjustment is performed at a time interval (figure 6); and where the dynamic adjustment is a adjustment rate that is applied continuously during the time interval (figure 6; Note: the system disclosed is constantly updating and therefore the time interval would be however fast it can get through the tracking process before starting it again. Also, as shown in figure 6, the speed is being updated during the interval shown and therefore is constantly updating during the time interval).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin E. Shepard whose telephone number is (571) 272-5967. The examiner can normally be reached on 7:30-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on (571) 272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS


CHRIS KELLEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600